

# PATENT ABSTRACTS OF JAPAN

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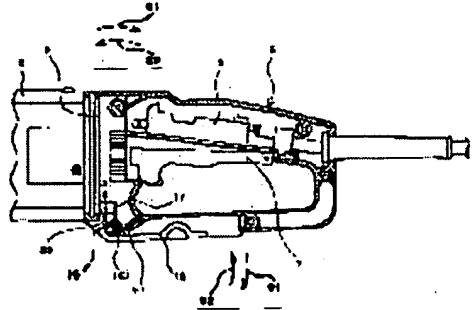
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## (54) POWER TOOL

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To set a direction of a tool part in accordance with a work condition, by providing a fixed member having a contact part capable of coming into contact with a main unit or the other contact objective part in a handle part to be switched to a fixed position or released position.

**SOLUTION:** When a lever 13 is placed in a fixed position, a fixed block 17 is energized in a prescribed direction by a torsional coil spring 15. As a result, a contact plane of the fixed block 17 presses an objective plane part. Here, between the objective plane part and the contact plane, frictional force for maintaining a position relation between a main unit 2 and a handle part 5 is generated. Next, the lever 13 is turned in a direction reverse to the prescribed direction, to be switched to a released position in a condition protruded from a peripheral surface of the handle part 5. In accordance with this switching, the fixed block 17 is turned in a direction reverse to the prescribed direction against energization of the torsional coil spring 15. By this turning, contact of the contact plane and the objective plane part of the fixed block 17 is released, the main unit 2 and the handle part 5 are made mutually rotatable.



## LEGAL STATUS

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] It is attached in the body and body which have the tool section which operates in response to the fact that motorised, and a body is received. The pivotable handle section, It is the holddown member prepared in either a body or the handle section. It is the power tool equipped with the holddown member which has the contact section which can contact the section for contact of another side of a body or the handle section, and is cut and replaced with a fixed position or a discharge location. The section for contact It is mostly formed over the whole. the rotation orbit top of the contact section — a holddown member The power tool characterized by what contact in the contact section and the section for contact is solved, and the handle section is made pivotable for to a body when the contact section contacts the section for contact when located in a fixed position, the physical relationship of the handle section to a body is fixed and it is located in a discharge location.

[Claim 2] It is attached in the body and body which have the tool section which operates in response to the fact that motorised, and a body is received. The pivotable handle section, It is the holddown member prepared in either a body or the handle section. It has the contact section which can contact the section for contact of another side of a body or the handle section. When it is the power tool equipped with the holddown member cut and replaced with the discharge location in the condition of projecting from the peripheral face of the fixed position in the condition of having been contained along with the peripheral face of a body or the handle section, a body, or the handle section and a holddown member is located in a fixed position, The power tool characterized by what contact in the contact section and the section for contact is solved, and the handle section is made pivotable for to a body when the contact section contacts the section for contact, fixes the physical relationship of the handle section to a body and is located in a discharge location.

[Claim 3] It is the power tool which said section for contact is formed as a crevice or heights in the power tool concerning claim 2, and is characterized by what the physical relationship of the handle section to a body is fixed for when the contact section engages with the section for contact when said contact section is formed as the heights which engage with the crevice or heights of said section for contact, or a crevice and said holddown member is located in a fixed position.

[Claim 4] It is the power tool characterized by what said holddown member cuts in a fixed position or a discharge location by rotating centering on a fixed part axis of member in the power tool concerning claim 1 or claim 2, and is replaced.

[Claim 5] It is the power tool which said section for contact is formed as a flat surface in the power tool concerning claim 4, and is characterized by what the physical relationship of the handle section to a body is fixed for when the contact section presses the section for contact when said contact section is formed as a flat surface and said holddown member is located in a fixed position.

[Claim 6] It is the power tool which said section for contact is formed as continuous concave heights in the power tool concerning claim 4, and is characterized by what the physical relationship of the handle section to a body is fixed for when the contact section engages with the section for contact when said contact section is formed as continuous concave heights which engage with the concave heights of said section for contact and said holddown member is located in a fixed position.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the structure of the power tool which can set up the sense of the tool section especially according to an activity situation about the structure of a power tool.

[0002]

[Description of the Prior Art] As 1st conventional example of a power tool, there is a grinder as shown for example, in drawing 8 A. The abrasive disc 65 is formed at the tip of the body section 62, and this abrasive disc 65 rotates in response to the drive of a motor. The handle section 64 is connected to body section 62 posterior part. As shown in drawing 8 B, the handle section 64 is constituted by the half-segmented sections 64A and 64beta. The body section 62 has the circular-sulcus section 67 into a connection part, and the handle section 64 has the annular projected part 68 into the connection part. When the annular projected part 68 engages with this circular-sulcus section 67, the body section 62 and the handle section 64 are connected.

[0003] As shown in drawing 8 A and drawing 8 B, near the annular projected part 68 of the handle section 64, the bolting screw 77 has penetrated, a locknut 78 is thrust into this bolting screw 77, and the half-segmented sections 64alpha and 64beta are being connected and fixed.

[0004] By bolting the bolting screw 77 with a driver, the half-segmented sections 64alpha and 64beta are bound tight. Consequently, the annular projected part 68 is pressed by inboard and engagement in the circular-sulcus section 67 becomes strong. By this, the physical relationship of the body section 62 and the handle section 64 can be held.

[0005] By loosening the bolting screw 77 with a driver, bolting of handle section 64alpha and handle section 64beta can loosen. Consequently, as for \*\*\*\*\*, the body section 62, and the handle section 64, interlocking of the annular projected part 68 and the circular-sulcus section 67 becomes pivotable. The body section 62 is rotated in this condition, and the sense of an abrasive disc 65 is adjusted according to an activity situation.

[0006] The bolting screw 77 is again bolted with a driver in this condition. The physical relationship of the adjusted body section 62 and the handle section 64 is fixable with this.

[0007] Moreover, as the 2nd example of a power tool, there is an electric cutter as shown in drawing 9. The cutter 85 is formed at the tip of the body section 82, and this cutter 85 rotates in response to the drive of a motor. The handle section 84 is connected to body section 82 posterior part. The body section 82 has coupling 83A in a connection, and the handle section 84 also has coupling 83B in the connection. The body section 82 and the handle section 84 are connected to this coupling 83A and coupling 83B being engaged.

[0008] Moreover, the rod 89 is formed in two places at the handle section 84. When carrying out rotation accommodation of the handle section 84, a rod 89 is pushed in inside. By this, the stopper formed in the interior releases engagement to coupling 83A and coupling 83B. By this, the body section 82 and the handle section 84 become pivotable. A stopper engages with coupling 83A and coupling 83B again in the location which the physical relationship of the body section 82 and the handle section 84 rotated 90 degrees. The physical relationship of the body section 82 and the handle section 84 is held by this.

[0009] in addition, rotation of the body section 82 and the handle section 84 — right-handed rotation or left-handed rotation — it is restricted to either and the angle of rotation is 90 degrees.

[0010]

[Problem(s) to be Solved by the Invention] The above-mentioned conventional power tool had the following faults. First, in the power tool of the 1st conventional example shown in drawing 8, in case the physical relationship of the body section 62 and the handle section 64 is switched, after loosening the bolting screw 77, canceling immobilization of the handle section 64 and the body section 62 and adjusting the physical relationship of the handle section 64 and the body section 62, the bolting screw 77 must be tightened again.

[0011] Moreover, tools, such as a driver, are required in order to loosen or tighten the bolting screw 77. Thus, when switching the physical relationship of the body section 62 and the handle section 64, there was a problem that a change took time and effort.

[0012] Next, in the power tool of the 2nd conventional example shown in drawing 9, the fixed position of the handle section 84 and the body section 82 is limited right-handed rotation or one of in the counterclockwise direction by the include angle of 90 degrees from the location of a basis. Therefore, there is a problem that the handle section 84 and the body section 82 are unfixable by the physical relationship of arbitration.

[0013] Moreover, in case the physical relationship of the body section 82 and the handle section 84 is switched, a rod 89 is pushed in and the handle section 84 is rotated to the body section 82. For this reason, a rod 89 is pushed in suddenly, immobilization with the body section 82 and the handle section 84 is canceled, and there is a problem that the handle section 84 will be in a pivotable condition.

[0014] Then, this invention can set up the sense of the tool section according to an activity situation, can raise workability, and can hold easily and certainly the physical relationship of the tool section and the handle section which were moreover set up, and aims at offering the power tool which can change the handle section into a pivotable condition easily.

[0015]

[Means for Solving the Problem] The body which has the tool section in which the power tool concerning claim 1 operates in response to the fact that motorised, It is the holddown member which is attached in the body and prepared in either the pivotable handle section, a body or the handle section to the body. It is the power tool equipped with the holddown member which has the contact section which can contact the section for contact of another side of a body or the handle section, and is cut and replaced with a fixed position or a discharge location. The section for contact It is mostly formed over the whole. the rotation orbit top of the contact section — a holddown member When the contact section contacts the section for contact when located in a fixed position, the physical relationship of the handle section to a body is fixed and it is located in a discharge location, contact in the contact section and the section for contact is solved, and it is characterized by what the handle section is made pivotable for to a body.

[0016] The body which has the tool section in which the power tool concerning claim 2 operates in response to the fact that motorised, It is the holddown member which is attached in the body and prepared in either the pivotable handle section, a body or the handle section to the body. It has the contact section which can contact the section for contact of another side of a body or the handle section. When it is the power tool equipped with the holddown member cut and replaced with the discharge location in the condition of projecting from the peripheral face of the fixed position in the condition of having been contained along with the peripheral face of a body or the handle section, a body, or the handle section and a holddown member is located in a fixed position, When the contact section contacts the section for contact, fixes the physical relationship of the handle section to a body and is located in a discharge location, contact in the contact section and the section for contact is solved, and it is characterized by what the handle section is made pivotable for to a body.

[0017] In the power tool which the power tool concerning claim 3 requires for claim 2, said section for contact is formed as a crevice or heights. Said contact section It is formed as the heights which engage with the crevice or heights of said section for contact, or a crevice, and when said holddown member is located in a fixed position, and the contact section engages with the section for contact, it is characterized by what the physical relationship of the handle section to a body is fixed for.

[0018] In the power tool which the power tool concerning claim 4 requires for claim 1 or claim 2, said

holddown member is characterized by what is cut and replaced with a fixed position or a discharge location by rotating centering on a fixed part axis of member.

[0019] In the power tool which the power tool concerning claim 5 requires for claim 4, said section for contact is formed as a flat surface, and said contact section is formed as a flat surface, and when said holddown member is located in a fixed position, and the contact section presses the section for contact, it is characterized by what the physical relationship of the handle section to a body is fixed for.

[0020] In the power tool which the power tool concerning claim 6 requires for claim 4, said section for contact is formed as continuous concave heights. Said contact section It is formed as continuous concave heights which engage with the concave heights of said section for contact, and when said holddown member is located in a fixed position, and the contact section engages with the section for contact, it is characterized by what the physical relationship of the handle section to a body is fixed for.

[0021]

[Effect of the Invention] In the power tool concerning claim 1, the handle section is pivotable to a body. For this reason, the handle section can be rotated to a body and the physical relationship of a body and the handle section can be set as arbitration. Therefore, it is possible to set up the sense of the tool section according to an activity situation, and workability can be raised.

[0022] When a holddown member can be switched to a fixed position or a discharge location and it is located in a fixed position, the contact section contacts the section for contact and fixes the physical relationship of the handle section to a body. moreover, the section for contact — the rotation orbit top of the contact section — it is mostly formed over the whole. And when located in a discharge location, contact in the contact section and the section for contact is solved, and the handle section is made pivotable to a body.

[0023] Thus, the physical relationship of the handle section to a body can be fixed and canceled only by switching a holddown member. Moreover, since [ on the rotation orbit of the contact section ] it is mostly formed over the whole, the section for contact can fix the physical relationship of the handle section to a body in the location of arbitration. Therefore, the physical relationship of the tool section and the handle section can be set as the location of arbitration, and the physical relationship of the tool section and the handle section which were set up can be held easily and certainly by switching a holddown member to a fixed position. Moreover, the handle section can be easily changed into a pivotable condition by switching a holddown member to a discharge location.

[0024] In the power tool concerning claim 2, the handle section is pivotable to a body. For this reason, the handle section can be rotated to a body and the physical relationship of a body and the handle section can be set as arbitration. Therefore, it is possible to set up the sense of the tool section according to an activity situation, and workability can be raised.

[0025] When a holddown member can be switched to a fixed position or a discharge location and it is located in a fixed position, the contact section contacts the location for contact and fixes the physical relationship of the handle section to a body. And when located in a discharge location, contact in the contact section and the section for contact is solved, and the handle section is made pivotable to a body.

[0026] Thus, the physical relationship of the handle section to a body can be fixed and canceled only by switching a holddown member. Therefore, the physical relationship of the tool section and the handle section which were set up can be held easily and certainly by switching a holddown member to a fixed position. Moreover, the handle section can be easily changed into a pivotable condition by switching a holddown member to a discharge location.

[0027] Moreover, a holddown member switches to the discharge location in the condition of projecting from the peripheral face of the fixed position in the condition of having been contained along with the peripheral face of a body or the handle section, a body, or the handle section. That is, it can switch to a discharge location from a fixed position only after being able to make a holddown member able to project from the peripheral face of a body or the handle section. Therefore, the holddown member in a fixed position is pushed in suddenly, and is not switched to a discharge location. Therefore, it is avoidable that the handle section becomes pivotable to a body suddenly.

[0028] In the power tool concerning claim 3, the section for contact is formed as a crevice or heights,

and the contact section is formed as the heights which engage with the crevice or heights of said section for contact, or a crevice. And when a holddown member is located in a fixed position, and the contact section engages with the section for contact, the physical relationship of the handle section to a body is fixed.

[0029] Therefore, the physical relationship of the handle section to a body can be fixed by engagement to the crevice of the section for contact or heights, and the heights of the contact section or a crevice, and the physical relationship of the tool section and the handle section which were set up more certainly can be held.

[0030] In the power tool concerning claim 4, a holddown member switches to a fixed position or a discharge location by rotating centering on a fixed part axis of member. For this reason, only by rotating a holddown member, the physical relationship of the handle section to a body can be fixed, or the handle section can be made pivotable to a body.

[0031] Therefore, by the simple configuration, the physical relationship of the tool section and the handle section which were set up can be held easily and certainly, or the handle section can be easily changed into a pivotable condition.

[0032] In the power tool concerning claim 5, the section for contact is formed as a flat surface, and the contact section is formed as a flat surface. And when a holddown member is located in a fixed position, and the contact section presses the section for contact, the physical relationship of the handle section to a body is fixed.

[0033] Therefore, the physical relationship of the handle section to a body can be held with the frictional resistance of the section for contact, and the contact section.

[0034] In the power tool concerning claim 6, the section for contact is formed as continuous concave heights, and the contact section is formed as continuous concave heights which engage with the concave heights of the section for contact. And when a holddown member is located in a fixed position, and the contact section presses the section for contact, the physical relationship of the handle section to a body is fixed.

[0035] Therefore, the physical relationship of the handle section to a body can be fixed by engagement of the concave heights of the section for contact, and the contact section, and the physical relationship of the tool section and the handle section which were set up more certainly can be held.

[0036]

[Embodiment of the Invention]

A grinder is explained to an example for the 1st operation gestalt of the power tool concerning [operation gestalt of \*\* 1st] this invention. Drawing 1 is general drawing of the grinder in this operation gestalt which includes a sectional view in part. The motor is built in the body 2. Moreover, the rotation grinding stone 4 as the tool section is formed at the tip of a body 2, and this rotation grinding stone 4 carries out rotation actuation in response to the drive of a motor.

[0037] The handle section 5 is connected to the body 2. A body 2 and the handle section 5 are connected when the annular concave heights 9 prepared in the annular concave heights 8 prepared in the body 2 and the handle section 5 are engaged. By this, the handle section 5 is rotated to a body 2, and it becomes possible to set the physical relationship of a body 2 and the handle section 5 as arbitration.

[0038] Moreover, the handle section 5 has the switch 3 and the switch trigger 7. By grasping the switch trigger 7, a switch 3 is turned on, a motor drives and the rotation grinding stone 4 rotates. Moreover, if the switch trigger 7 is released, a switch 3 will become off and the rotation grinding stone 4 will suspend rotation.

[0039] In this operation gestalt, it is the purpose which prevents torsion of the code which happens when the handle section 5 rotates to a body 2, and a debt, and the device in which rotation of the handle section 5 is restricted is established. This device is explained using drawing 5 A and B.

[0040] drawing 5 A -- the sectional view of the connection of a body 2 and the handle section 5 -- it is -- drawing 5 B -- a part of connection of a body 2 and the handle section 5 -- it is a cross-section top view. In addition, drawing 5 A is the view sectional view of the direction of VA-VA shown in drawing 5 B.

[0041] The projection 52 is formed in the body 2 and Projections 53R and 53L are formed in the

handle section 5. Projections 53R and 53L are mostly formed in the location of the symmetry. Moreover, contact flat-surface section 8S as the section for contact are prepared in the range of about 180 degrees, as shown in drawing 5 A. the condition of drawing 5 A and B — projection 52 — projection 53R and projection 53L — any — not contacting — both — it is mostly located in the middle. This condition is an initial valve position and it is in the condition shown in drawing 1 .

[0042] The handle section 5 is rotated in the arrow-head 95 direction from the initial valve position of drawing 5 A. Then, projection 53L contacts projection 52 in the place rotated about 90 degrees, and the rotation to the arrow-head 95 direction of the handle section 5 is regulated. Moreover, the handle section 5 is rotated in the arrow-head 96 direction from the initial valve position of drawing 5 A. Then, projection 53R contacts projection 52 in the place rotated about 90 degrees, and the rotation to the arrow-head 96 direction of the handle section 5 is regulated. That is, projection 52 and Projections 53R and 53L can restrict the rotation range of the handle section 5 to the range of about 180 degrees.

[0043] Moreover, he is trying for a feeling of a click to produce the initial valve position of a body 2 and the handle section 5, and the handle section 5 with this operation gestalt in the location rotated in arrow-head 95 direction and the arrow-head 96 direction 90 degrees. This device is explained using drawing 5 A and drawing 6 . Here, drawing 6 is the enlarged drawing of the X section of drawing 5 A.

[0044] As shown in drawing 5 A, the notching section 56 is provided in four right-angle 2-ways at the annular concave heights 8 of a body 2. Yamabe 57 is formed in the inside (side in which the switch 3 is stored) at the handle section 5, and when this Yamabe 57 engages with the notching section 56, a feeling of a click is obtained. By this, the standard of a body 2 and the physical relationship of the handle section 5 can be obtained. In addition, Yamabe 57 is a thing of extent which does not cause trouble to that the handle section 5 especially rotates.

[0045] Next, the device which fixes a body 2 and the physical relationship of the handle section 5 is explained using drawing 2 and drawing 3 . Drawing 2 R 2 shows the fixed position of lever 13 grade, and drawing 3 shows the discharge location of lever 13 grade. The lever 13 is rotatable in an arrow head 91 and 92 directions focusing on rotation shaft 15J which are a fixed part axis of member. The fixed block 17 is formed in this lever 13 in one. The fixed block 17 has contact flat-surface 17S as the contact section. In addition, a lever 13 and a fixed block 17 are the holddown members in this operation gestalt.

[0046] Moreover, the torsion coil spring 15 is supported to revolve by rotation shaft 15J. The end of a torsion coil spring 15 is in contact with fixed wall 5T of the handle section 5, and the other end is connected to the fixed block 17. Drawing 4 is the cross-section top view seen from [ which is shown in drawing 2 ] IV. As shown in this drawing 4 , contact flat-surface 17S of a fixed block 17 are formed as a flat surface. Moreover, object flat-surface section 8S are formed as a flat surface.

[0047] With this operation gestalt, as shown in drawing 2 and drawing 3 , the lever 13 and the fixed block 17 are really formed in the L character mold. Therefore, according to the rotation to the arrow head 91 of a lever 13, and 92 directions, a fixed block 17 rotates similarly.

[0048] As shown in drawing 2 , when it is in the fixed position in the condition that the lever 13 was contained along with the peripheral face of the handle section 5, a fixed block 17 is energized by the torsion coil spring 15 in the arrow-head 92 direction. Consequently, contact flat-surface 17S of a fixed block 17 press object flat-surface section 8S (refer to drawing 5 A). At this time, the frictional force for maintaining a body 2 and the physical relationship of the handle section 5 occurs between object flat-surface section 8S and contact flat-surface 17S. A body 2 and the physical relationship of the handle section 5 are fixed by this.

[0049] Next, as shown in drawing 3 , it is about a lever 13. It is made to rotate in the arrow-head 91 direction, and switches to the discharge location in the condition of projecting from the peripheral face of the handle section 5. According to this, a fixed block 17 rotates in the arrow-head 91 direction against energization of a torsion coil spring 15. The contact to contact flat-surface 17S of a fixed block 17 and object flat-surface section 8S is solved by this rotation, a body 2 and the handle section 5 become pivotable mutually by it, and it becomes possible to change both physical relationship.

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**[Drawing\_1]**

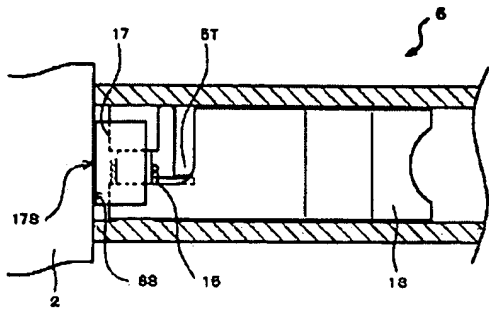
**[Drawing 2]**

Figure 6 shows a detailed cross-section of the front portion of the device. It illustrates the internal assembly where the coil spring (18) is housed within a chamber. The valve seat (17) is positioned at the bottom of this chamber. Various seals and O-rings are shown, labeled as 91 and 92, which likely serve to prevent leakage or provide airtight sealing between different parts of the housing. Other components visible include a piston-like structure (16) and various mounting points and fasteners.

83: 構造対象例  
18: レバー  
15: 車ノリコイルバネ  
15: 回転軸  
17: 固定ブロック  
178: 右側平面

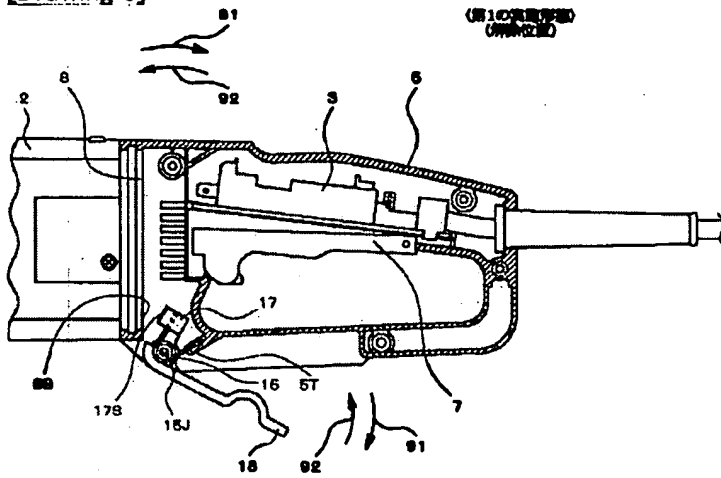
**[Drawing 4]**

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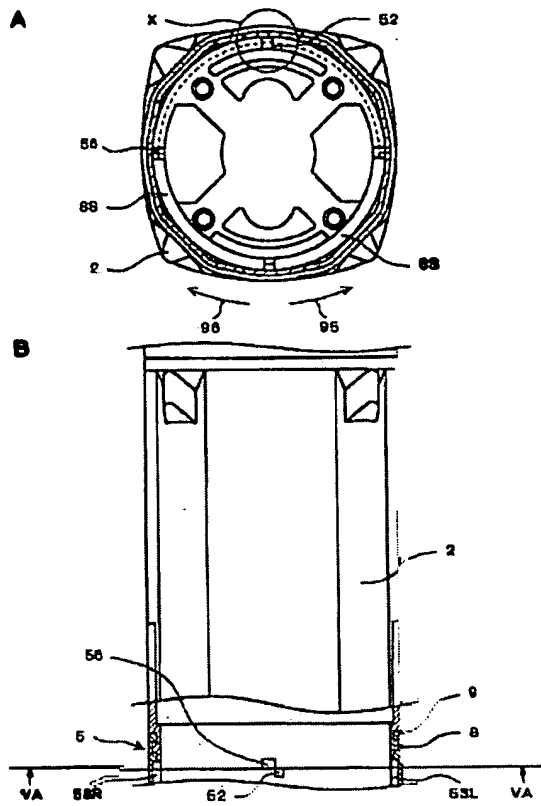


[Drawing 3]

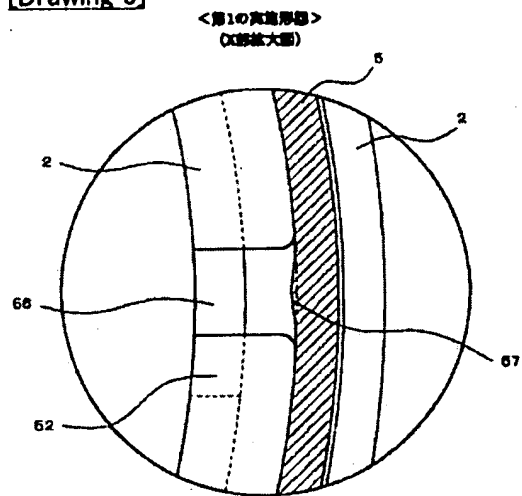
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変形例>



[Drawing 5]

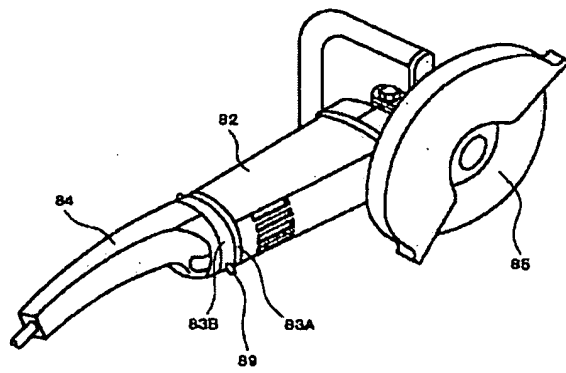


**[Drawing 6]**

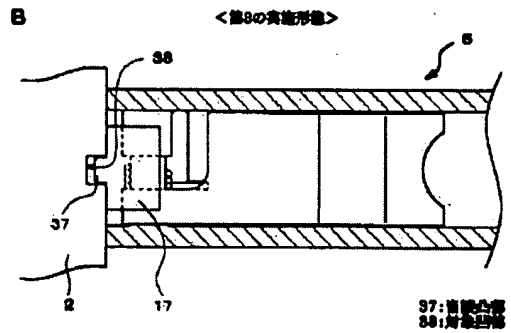
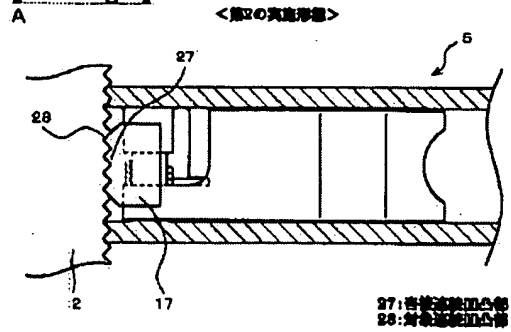


**[Drawing 9]**

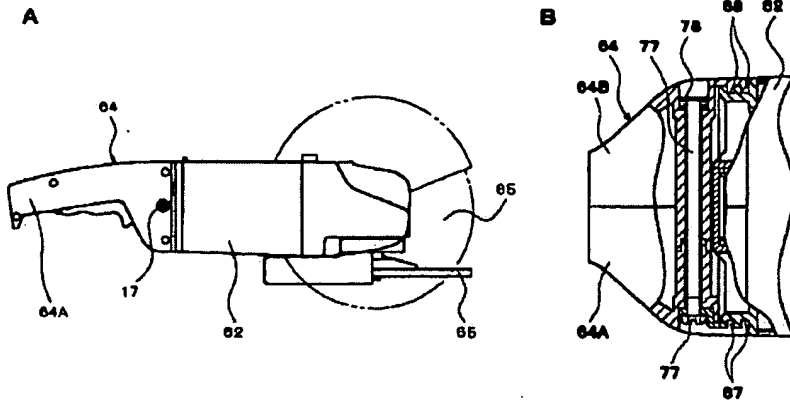
(第2の実施形態)



[Drawing 7]



[Drawing 8]



[Translation done.]

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